MIDI SYSTEM EXCLUSIVE DATA FORMAT FOR S900   Disk Version : V2.0

GENERAL NOTES

The purpose of interface is to allow a computer to control all S900 functions, to process and synthesize samples, and to allow the S900 to replay samples developed for other machines, e.g. Prophet 2000.

S900 is always a slave. It will never send unless it is told to. This means all data transfers out of S900 must use two way communication. S900 can however receive with an incoming connection only. Reception of sample dump is speeded up with a two way connection.

Programs and samples are requested by NUMBER. In the case of programs, this will correspond to the number on the PLAY menu-1. For samples, the number will be the order in which they are in S900's RAM. The program/name catalog sent by S900 has a number against each name, starting with 0.

When S900 receives a sample, the name it shows will be that number. Programs are received with an alphanumeric name.

Sample transfer is according to the standard described in the Prophet 2000 manual. This uses 'System exclusive common' which does not include a manufacturers prefix code. As it does not include a MIDI channel code, any samples sent, or requests for samples would be responded to by all samplers on the same MIDI line. The 'System exclusive common reception enable' and '...disable' messages, which do include a MIDI channel number, can be used to select one of several S900s on the same line.

A further enhancement of the standard sample dump protocol is that when closed loop transmission is used, the gaps between blocks may be as long as 10 seconds rather than the 20 ms specified. This allows the computer to use its disk in the middle of a long file. This variation maintains full compatibility with the standard.

There are several parameters associated with a S900 sample that are not included in the Prophet 2000 sample dump. These may be sent with the AKAI exclusive 'Sample parameters' messages.

The use of the above enhancements will not prevent the S900 from being completely compatible with the Prophet 2000 sample dump format.

RECOGNIZED BY S900:

EXCLUSIVE AKAI:

	MNEMONIC
Request for drum settings	0 - RDRS
Drum settings	7 - DRS
Request for overall settings	1 - ROVS
Overall settings	8 - OVS
Request for program	2 - RPRGM
Program	9 - PRGM
Request for program/sample name catalog	3 - RCAT
Request for sample parameters	4 - RSPRM ← *need to send*
Sample parameters	10 - SPRM *SECRE too*
System exclusive common reception enable	5 - SECRE
System exclusive common reception disable	6 - SECRD

SYSTEM EXCLUSIVE COMMON:

	MNEMOMIC
Request sample dump	0 RSD
Abort sample dump	7D ASD
Not acknowledge sample block (Request retransmission)	7E NAKS
Acknowledge sample block (or sample header)	7F ACKS
Sample dump	1 SD

TRANSMITTED BY S900:

AKAI exclusive:

	MNEMONIC
Drum settings	*Redundant* 7 DDRS
Overall settings	8 DOVS
Program	9 DPR
Sample parameters	10 DSP
Program/sample name catalog	11 (0B) CAT ← *new code*

Exclusive common:

	MNEMONIC
Sample dump	1 SD
Abort sample dump	7D ASD
Not acknowledge sample block	7E NAKS
Acknowledge sample block	7F ACKS

RECOGNIZED BY S900:

EXCLUSIVE AKAI:

	MNEMONIC
Request for drum settings	RDRS
Drum settings	DRS
Request for overall settings	ROVS
Overall settings	OVS
Request for program	RPRGM
Program	PRGM
Request for program/sample name catalog	RCAT
Request for sample parameters	RSPRM
Sample parameters	SPRM
System exclusive common reception enable	SECRE
System exclusive common reception disable	SECRD

SYSTEM EXCLUSIVE COMMON:

	MNEMOMIC
Request sample dump	RSD
Abort sample dump	ASD
Not acknowledge sample block (Request retransmission)	NAKS
Acknowledge sample block (or sample header)	ACKS
Sample dump	SD

TRANSMITTED BY S900:

AKAI exclusive:

	MNEMONIC
Drum settings	DDRS
Overall settings	DOVS
Program	DPR
Sample parameters	DSP
Program/sample name catalog	CAT

Exclusive common:

	MNEMONIC
Sample dump	SD
Abort sample dump	ASD
Not acknowledge sample block	NAKS
Acknowledge sample block	ACKS

DETAILED SPECIFICATION OF MESSAGES

SAMPLE DUMP FORMAT (as recognized and transmitted by S900)

BYTE	RANGE	TYPE*	DESCRIPTION
0	F0H	B	System exclusive code.
1	7EH	B	Common non-realtime indentifier.
2	1	B	SD, Sample dump code.
3	0-31	B	Sample number's LSB.
4	0	B	Sample number's MSB, always 0 since S900 has only 32 samples.
5	8-16	B	Bits per word. S900 transmits 12, but can accept 8 to 14.
6-8	0-127	TB	SAMPLING PERIOD in nS. S900 accepts 15259 to 500000.
9-11	0-127	TB	TOTAL WORDS IN SAMPLE. S900 accepts 200 to 475020.
12-14	0-127	TB	LOOP START POINT. If it is equal or larger than TOTAL WORD-5, assume non-looping. *And #s sent = total words -5]*
15-17	0-127	TB	LOOP END. S900 takes this as end point.
18	0,1	B	Mode. 0=looping, 1=alternating(One shot if loop length is smaller than 5). *(newer samplers, 7F = one-shot set loop start and end same as sample length)*

Next follows a variable number of sample blocks. Each has the same format:

BYTE	RANGE	TYPE*	DESCRIPTION
0	0-127	B	Block number LSbyte(Block number MSbyte is not sent).
1,2	0-127	SW	SAMPLE DATA
3-120			59 more sample data as 1,2 above.
121	0-127	B	CHECKSUM, being the exclusive-OR of the previous 120 bytes.

A final byte follows the last block:

BYTE	RANGE	TYPE	DESCRIPTION
??	F7H	B	EOX

Ack sent by Akai after header + after each block.

SYSTEM COMMON HANDSHAKES (recognized and transmitted by S900)

BYTE	RANGE	TYPE*	DESCRIPTION
0	F0H	B	System exclusive code.
1	7EH	B	Common non-realtime code.
2	ff	B	Function code:
			ACKS=7FH Acknowledge sample block or header
			ASD =7DH Abort sample dump
			NAKS=7EH Not acknowledge (Request re-transmission of block)
3	F7H	B	EOX

SYSTEM COMMON REQUEST SAMPLE DUMP (recognized by S900)

BYTE	RANGE	TYPE*	DESCRIPTION
0	F0H	B	System exclusive code.
1	7EH	B	Common non-realtime code.
2	0	B	RSD, Request sample dump code.
3	0-31	B	Sample #, according to order in S900's RAM.
4	0	B	Reserved (must be 0).
5	F7H	B	EOX

AKAI EXCLUSIVE MESSAGES (recognized by S900)

BYTE	RANGE	TYPE*	DESCRIPTION
0	F0H	B	System exclusive code.
1	47H	B	AKAI identifier.
2	0-15	B	MIDI channel #.
3	gg	B	Function code:

    RDRS = 0 Request for drum settings
    ROVS = 1 Request for overall settings
    RPRGM= 2 Request for program
    RCAT = 3 Request for sample/preset catalog
    RSPRM= 4 Request for parameters
    SECRE= 5 System exclusive common reception enable
    SECRD= 6 System exclusive common reception disable

BYTE	RANGE	TYPE*	DESCRIPTION
4	64	B	S900 identifier.
5	0-31	B	Preset/sample number, where applicable.
6	0	B	Reserved (must be 0).
7	F7H	B	EOX

AKAI EXCLUSIVE Name catalog (transmitted by S900)

BYTE	RANGE	TYPE*	DESCRIPTION
0	F0H	B	System exclusive code.
1	47H	B	AKAI identifier.
2	0-15	B	MIDI channel #.
3	11	B	CAT, Function code for name catalog.
4	64	B	S900 identifier. 40Hex (S1000 sampler is 48Hex)
5	X		Undefined.
6	0	B	Reserved (must be 0).

Each catalog entry is a block of 12 bytes:

BYTE	RANGE	TYPE*	DESCRIPTION
0	"P,S"	B	Type, "P"=program, "S"=sample.
1	0-31	B	Program/sample number. The order it appears in S900's memory.
2-11	0-127	B	ASCII characters of name.

BYTE	RANGE	TYPE*	DESCRIPTION
??	0-127		CHECKSUM, exclusive-OR of preceding bytes without 0 to 6 preceding blocks of 12 bytes.
??	F7H	B	EOX

AKAI EXCLUSIVE Drum settings (recognized and transmitted by S900)

BYTE	RANGE	TYPE*	DESCRIPTION
0	F0H	B	System exclusive code.
1	47H	B	AKAI identifier.
2	0-15	B	MIDI channel #.
3	7	B	DRS, Function code for drum settings.
4	64	B	S900 identifier.
5	X		Undefined.
6	0	B	Reserved (must be 0).
7,8	0,255	DB	DRUMON. Drum inputs, 0=off, 255=on.
9,10	0,1	DB	DRUMSENS. Sensitivity, 0=low, 1=high. Affects all inputs.
11-50	0	B	Reserved (must be 0).
51-530			Here follow eight blocks of MIDI 60 bytes, one for each drum input. Each block is as follows:

BYTE	RANGE	TYPE*	MNEMONIC	NOM. VAL	DESCRIPTION
0,1	0-7	DB	DINP	0	Drum input number (CONSTANT).
2,3	0-15	DB	DRMDCH	0	MIDI channel that drum input simulates.
4,5	24-127	DB	DPITCH	60	MIDI coded pitch.
6,7	1-99	DB	DSENS99	50	User's input sensitivity (Gain).
8,9	1-40	DB	DTT40	20	Trigger threshold, coded 1 to 40.
10,11	11-128	DB	DTTFS	68	Must be 8 + DTT40 x 3.
12-15	X	DW		X	Undefined.
16-23	0	DD		0	Reserved.
24-27	4-80	DW	DATTIME	12	ATTACK CAPTURE TIME. Take biggest value during this period after threshold to make velocity. Units of 0.25mS, 1-20mS.
27-31	4-39996	DW	DONTIME	120	ON TIME DURATION. Units of 0.25mS, 1-9999mS.
32-35	4-396	DW	DRCTIME	80	RECOVERY TIME. Units of 0.25mS, 1-99mS.
36-39	1-66	DW	DSENSFS	33	Must be DSENS99 x 171/256.
40-47	X	DD		X	Undefined.
48-51	X	DW		X	Undefined.
52-55		DW	DENVHOLD	1040H	Must be 1040H + DINP x 512 (Constant).
56-59		DW	DADCMUX	3040H	Must be 3040H + DINP x 256 (Constant).

    End of drum input block

BYTE	RANGE	TYPE*	DESCRIPTION
531	0-127	B	CHECKSUM, exclusive-OR of preceding 480 bytes.
532	F7H	B	EOX

AKAI EXCLUSIVE Overall settings (recognised and transmitted by S900)

BYTE	RANGE	TYPE*	DESCRIPTION
0	F0H	B	System exclusive code.
1	47H	B	AKAI identifier.
2	0-15	B	MIDI channel #.
3	8	B	OVS, Function code for overall settings.
4	64	B	S900 identifier.
5	X		Undefined.
6	0	B	Reserved (must be 0).

Overall settings data:

BYTE	RANGE	TYPE*	MNEMONIC	NOM. VAL	DESCRIPTION
7-26		DB*	PRONAME		"DEFAULT PR" Name of current program.
27-34	X	DD		X	Undefined.
35-38	X	DW		X	Undefined.
39,40	0-15	DB	MDXTCH	0	MIDI transmit channel for AKAI exclusive.
41,42	0	DB		0	Reserved.
43-46	X	DW		X	Undefined.
47-50	1-16	DW	RSCHNL	1	Reception simulator channel, 1 to 16.
51-54	24-127	DW	RSKEY	60	Reception simulator MIDI KEY, 24-127.
55-58	1-127	DW	RSVEL	64	Reception simulator VELOCITY.
59,60	X	DB		X	Undefined.
61,62	0-15,128	DB	BASMCH	128	S900 basic MIDI reception channel, coded 0-15. If MSB is set(128), S900 is set to OMNI ON.
63,64		DB	MLEN	0	Reception of loudness on continuous controller #7, 0=disable, any other value=enable.
65,66	1,2	DB	M1RS2	1	Select controller, 1=MIDI, 2=RS-232C.
67,68		DB	MPEN	60	MIDI program change reception, 0=disable, any other value=enable.
69-72	20727	DW		20727	Reserved.
73-76	7238	DW		7238	Reserved.
77,78	0-12	DB	PWRANGE	7	PITCH WHEEL RANGE, semitones UP or DOWN.
79-82		DW	RSBAUD	960	Nominal RS-232C baud rate in 1/10 (e.g. 960 means 9600 baud).
83-86	0	DW		0	Reserved.

End of overall settings data.

BYTE	RANGE	TYPE*	DESCRIPTION
87	0-127	B	CHECKSUM, exclusive-OR of preceding 80 bytes.
88	F7H	B	EOX

AKAI EXCLUSIVE program (recognized and transmitted by S900)
    Note: On reception of a program, it becomes the selected one.

BYTE	RANGE	TYPE*	DESCRIPTION
0	F0H	B	System exclusive code.
1	47H	B	AKAI identifier.
2	0-15	B	MIDI channel #.
3	9	B	PRGM, Function code for program & keygroups
4	64	B	S900 identifier.
5	0-31	B	Program number. When S900 is sending a program, this will be the same number as requested. When S900 is receiving, this will replace a program of the same number.
6	0	B	Reserved (must be 0).

Here follows a block of 76 bytes giving program parameters:

Byte	Range	Type	Mnemonic	Description
7-26		DB*	PRNAME	"??????????", name of current program.
27-34	X	DD		Undefined.
35-38	X	DW		Undefined.
39-42		DW	KTILT	KEYBOARD TILT (loudness). Key versus loudness, -50 to +50.
43-46	X	DW		Undefined.
47,48	X	DB		Undefined.
49,50	0,1	DB	POSXEN	Positional crossfade, 0=disable, 1=enable.
51,52	255	DB		Reserved.
53,54	1-31	DB	NOKG	Number of keygroups in this program.
55-58	X	DW		Undefined.
59-66	0	DD		Reserved.
67-74	0	DD		Reserved.
75-82	0	DD		Reserved.
83-??				Here follows 1 or more blocks defining the keygroups. Each block uses 140 MIDI bytes and is defined as follows:

BYTE	RANGE	TYPE*	MNEMONIC	NOM. VAL	DESCRIPTION
0,1	24-127	DB	UMK	127	Upper MIDI key (limit of keyrange of this keygroup).
2,3	24-127	DB	LMK	24	Lower MIDI key. May be same as upper.
4,5	0-128	DB	VST	128	VELOCITY SWITCH THRESHOLD. If velocity is equal or larger than VST, then switch to second ("Loud") sample.
6,7	0-99	DB	ATK	00	ATTACK TIME, logarithmic coding.
8,9	0-99	DB	DCY	80	DECAY TIME, 99 gives max.
10,11	0-99	DB	SSTN	99	SUSTAIN LEVEL. 0.375dB/STEP, 0=-96dB, 99 gives max.
12,13	0-99	DB	RLSE	30	RELEASE TIME, 99 gives max.
14,15	0-99	DB	FVI	10	Filter-velocity interaction.
16,17	0-99	DB	FKI	50	Filter-key tracking. 50 gives 1 Octave/Octave.
18,19	0-99	DB	AVI	0	Attack-velocity interaction.
20,21	0-255	DB	RVI	00	Velocity release interaction, +/-50. If positive, greater note-off velocity gives faster release.
22,23	0-99	DB	LVI	30	Loudness-velocity interaction. 0=No dynamics.
24,25	0-99	DB	PVI	0	Pitch warp-velocity interaction.
26,27	0-255	DB	PAO	00	Pitch warp initial offset, +/-50.
28,29	0-99	DB	PST	99	Pitch warp recovery time. 99 is the slowest.
30,31	0-99	DB	VBDLY	64	LFO build-up time.
32,33	0-99	DB	VBRATE	42	LFO rate.
34,35	0-99	DB	VBDPTH	0	LFO depth.

```
36,37    0-63    DB    KBITS    4        ODD CONTROL BITS Coding:
                                            TRD    :Bit0 Transpose, 0=enable,
                                                          1=disable.
                                            VCXF   :Bit1 Velocity crossfade,
                                                          0=disable, 1=enable.
                                            VBDSYN:Bit2 Vibrato desync, 0=off,
                                                          1=on.
                                            OST    :Bit3 One shot trigger mode,
                                                          0=off, 1=on.
                                            ONRV   :Bit4 Velocity release from
                                                          note-off or note-on,
                                                          0=Note-off, 1=Note-on.
                                            ENVTMX:Bit5 Velocity crossfade
                                                          curve modification,
                                                          0=disable, 1=enable.

38,39    0-9,255 DB    OPVOICE  255      VOICE OUT ASSIGN.  0-7=MONO, 8=LEFT
                                         GROUP(0-3), 9=RIGHT RIGHT(4-7),
                                         255=ALL.
40,41    0-15    DB    KMDCHN   0        KEYGROUP MIDI channel offset.  This
                                         will be added to BASMCH (in overall
                                         settings) to match incoming MIDI.
42,43    0-99    DB    AFDI     0        AETER TOUCH depth modulation.
44,45    0-99    DB    MWDI     50       MOD WHEEL LFO depth modulation.
                                         NOTE: LFO depth modulation is the
                                         sum of VBDPTH(LFO depth) +
                                         AFDI(After Touch) + MWDI
                                         (Modwheel).  A maximum of +/- 3
                                         semitones.
46,47    0-255   DB    VCFAMNT  0        Amount of ADSR envelope applied to
                                         VCF filter frequency.  Signed +/- 50.
48-67            DB*   NAMEFS            "TONE.....:", name of first sample.
68,69    0-99    DB    VCFAK    20       Filter ADSR attack time.
70,71    0-99    DB    VCFDY    20       Filter ADSR decay time.
72,73    0-99    DB    VCFST    20       Filter ADSR sustain level.
74,75    0-99    DB    VCFRL    20       Filter ADSR release time.
76,77    0-127   DB    VTMX     64       Velocity value at which loud-soft
                                         mixture is 50% in velocity crossfade
                                         type sample.  This value will be
                                         ignored if ENVTMX bit in KBITS is 0.
     Above 5 contrls apply equally to first("Soft") and second("Loud") samples.
78,79    X       DB             X        Undefined.
80-83    X       DW             X        Undefined.
84-87            DW    TROFFS   0        Transpose offset.  Signed, units of
                                         1/16 semitones.
88,89    0-99    DB    FLTFS    99       FILTER.  99 gives highest cut-off.
90,91    0-255   DB    LOUDFS   0        Loudness.  Signed +/-50, units of
                                         0.375 dB.
     Above 3 controls apply only to first("soft") sample.
92-111           DB*   NAMESS            "TONE......", name of second("Loud")
                                         sample.
112-119  X       DD             X        Undefined.
120-127  X       DD             X        Undefined.
128-131          DW    TROFSS   0        Transpose offset.  Signed, units of
                                         1/16 semitones.
132,133  0-99    DB    FLTSS    99       FILTER.  99 gives highest cut-off.
```

```
134,135 0-255   DB    LOUDSS    0         Loudness.  Signed +/-50, units of
                                          0.375 dB.
```

Above 3 controls apply only to second("Loud") sample.

```
136-139 X       DW              X         Undefined.
```

End of keygroup block

BYTE	RANGE	TYPE*	DESCRIPTION
??	0-127	B	CHECKSUM, exclusive-OR of preceding bytes without 0 to 6 bytes before program parameter data.
??	F7H	B	EOX

AKAI EXCLUSIVE Sample parameters (recognized and transmitted by S900)

BYTE	RANGE	TYPE*	DESCRIPTION
0	F0H	B	System exclusive code.
1	47H	B	AKAI identifier.
2	0-15	B	MIDI channel #.
3	10	B	SPRM, Function code for sample parameters.
4	64	B	S900 identifier.
5	0-31	B	Sample number.
6	0	B	Reserved (must be 0).

Sample parameters as described below:

BYTE	RANGE	TYPE*			DESCRIPTION
7-26		DB*	SNAME		"TONE......", name of sample.
27-34	X	DD		X	Undefined.
35-38	X	DW		X	Undefined.
39-46		DD	SLNGTH	1800	Total number of words in sample. Note that for velocity-crossfade type sample, this will be the sum of soft and loud parts.
47-50		DW	SMRATE	11773	Original sample rate in Hz (=bandwidth x 2.5).
51-54		DW	SNOMP	960	Nominal pitch. Unsigned, units of 1/16 semitone. C3=960.
55-58		DW	SDFLDO	0	Loudness offset, signed.
59,60	"A,L,O"	DB	SRPLMD	"L"	REPLAY MODE. O=One shot, L=Looping, A=Alternating.
61,62		DB		0	Reserved.
63-70		DD	SEND	1800	End point relative to start of sample.
71-78		DD	SSTART	0	First replay point relative to start of sample.
79-86		DD	SLOOP	45	Length of looping or alternating part.
87-90	0	DW		0	Reserved.
91,92	0,255	DB	VC	0	Type of sample, 0=normal, 255=Velocity crossfade.
93,94	"N,R"	DB	NOREV	"N"	Sample waveform, R=reversed, N=normal.
95-102	X	DD		X	Undefind.
103-110	X	DD		X	Undefind.
111-118	X	DD		X	Undefind.
119-126	X	DD		X	Undefind.

End of sample block

BYTE	RANGE	TYPE	DESCRIPTION
127	0-127	B	CHECKSUM, exclusive-OR of preceding 120 bytes without 0 to 6 bytes before sample parameters.
128	F7H	B	EOX

TYPE* coding of B, DB, DB*, DD, DW, SW, and TB.

B represents a byte transmitted as a single MIDI byte.

DB represents an 8 bit parameter in S900's memory. It is sent as two MIDI bytes as:

```
first byte  : 0  d6  d5  d4  d3  d2  d1  d0
second byte : 0   0   0   0   0   0   0  d7
     where d0 is the parameter's least significant bit.
```

DB* represents 10 data bytes of ASCII character of name sent as 20 MIDI bytes in 10 sets of DBs.

DD represents a 32 bit quantity. It is sent as eight MIDI bytes as:

```
first byte  : 0  d6  d5  d4  d3  d2  d1  d0
second byte : 0   0   0   0   0   0   0  d7
third byte  : 0 d14 d13 d12 d11 d10  d9  d8
fourth byte : 0   0   0   0   0   0   0 d15
fifth byte  : 0 d22 d21 d20 d19 d18 d17 d16
sixth byte  : 0   0   0   0   0   0   0 d23
seventh byte: 0 d30 d29 d28 d27 d26 d25 d24
eighth byte : 0   0   0   0   0   0   0 d31
```

DW represents a 16 bit quantity. It is sent as four MIDI bytes as:

```
first byte  : 0  d6  d5  d4  d3  d2  d1  d0
second byte : 0   0   0   0   0   0   0  d7
third byte  : 0 d14 d13 d12 d11 d10  d9  d8
fourth byte : 0   0   0   0   0   0   0 d15
```

SW represents a 12 bit value transmitted as two MIDI bytes as:

most pos = all 1s
most neg = all 0s
zero scale = 1000...

```
first byte  : 0 d11 d10  d9  d8  d7  d6  d5
second byte : 0  d4  d3  d2  d1  d0   0   0
     where coding is offset binary, thus zero is sent as 40 00H.
```

TB represents a 21 bit value transmitted as three MIDI bytes as:

```
first byte  : 0  d6  d5  d4  d3  d2  d1  d0
second byte : 0 d13 d12 d11 d10  d9  d8  d7
third byte  : 0 d20 d19 d18 d17 d16 d15 d14
```

SIGNED and UNSIGNED.

Parameters described as signed are represented in 2's complement from, e.g. DB value of -1 = FFH.

ASCII.

Where a value is shown as a character in single quotes, it is in ASCII form with the MSB = 0, e.g. "A" = 41H.

UNDEFINED and RESERVED.

Reserved values are for possible future enhancements and must be transmitted as shown. Undefined values have no operational effect and might as well be filled with 0s.

TIMEOUT.

When receiving AKAI exclusive data after the first six bytes have been received, the remaining bytes must be separated by no more than 2 seconds. This provision protects the S900 from hanging in the event of incomplete messages.

RS-232C.

The S900 can receive either through MIDI or through RS-232C. The switch from one to the other can be made manually (p05 of MIDI menu), or by AKAI exclusive overall settings reception, or if an entire disk is loaded on which the overall settings was saved (This is done automatically when "entire memory" is saved.).

Specification for RS-232C:

Connector	25 pin "D". S900 is female.
Levels	High +3v to +15v, low -3v to -15v.
Bits	8.
Parity	None.
Stop bits	1.
Baud rate	300, 600, 1200, 2400, 4800, 9600, 19200 and also many non-standard rates up to 100000 baud. Default baud rate is 9600 baud. Transmission at higher rates than 19200 baud should use a short cable.
Protocol	Hardware handshake using CTS/RTS. Handshake need not be used on rates below 50000 baud, in which case RTS should be tied high.

S900 is configured as DCE(Data Circuit Terminating Equipment) and should be connected to most computers (e.g. NEC PC9801) by the straight cable with the following pin connections:

pin #	S900		Computer	Description
1	FG	---------	FG	Frame ground.
2	RXD	---------	TXD	Data in to S900.
3	TXD	---------	RXD	Data out of S900.
4	CTS	---------	RTS	Clear to send.
5	RTS	---------	CTS	Requesr to send.
7	GND	---------	GND	Signal ground.

The proper arrangement of pin 20 DTR and pin 6 DSR may be necessary depending on the computer used. Refer to the Operator's manual of the computer for details.
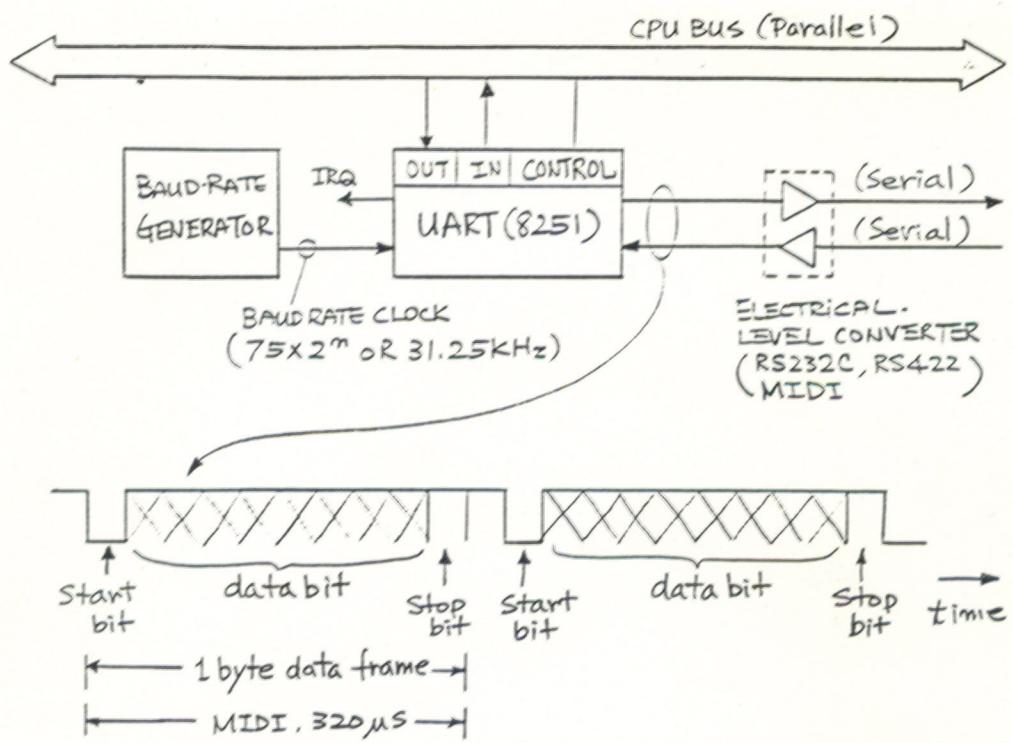
Fig. 3. Serial interface block diagram and data format.

PIN NO.	SIGNAL	DESCRIPTION	SIO
1	GND	FRAME GROUND	
2	TD	TRANSMIT DATA	TxD
3	RD	RECEIVE DATA	RxD
4	RTS	REQUEST TO SEND	RTS
5	CTS	CLEAR TO SEND	CTS
6	DSR	DATA SET READY	
7	GND	SIGNAL GROUND	
8	CD	CARRIER DETECT	
20	DTR	DATA TERMINAL READY	
9 -19		N.C.	
21 - 25			

(a)
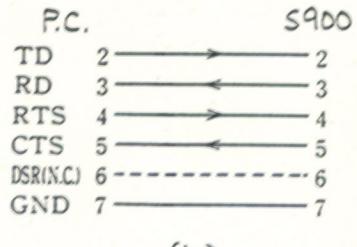
```
        P.C.              S900
TD      2  ─────────►    2
RD      3  ◄─────────    3
RTS     4  ─────────►    4
CTS     5  ◄─────────    5
DSR(N.C.) 6 ┄┄┄┄┄┄┄┄    6
GND     7  ─────────    7
```
(b)
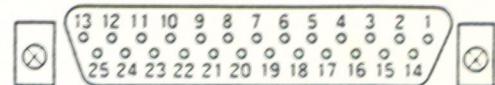
(c)

Fig. 4. RS-232C INTERFACE : (a) Signal lines ; (b) Connection (Straight line type) ; (c) Pin assign.

by C. Ueno 6/20/86

The S700 can receive either through MIDI or through RS232-C.
The switch from one to the other can be made manually, (p05 of
MIDI menu), or by AKAI exclusive overall settings reception, or
if an entire disk is loaded on which the overall settings was
saved. (This is done automatically when "entire memory" is saved.)

```
    Specification for RS232-C:
Bits              8
Parity            none
Stop bits         1
Baud rate         300, 600, 1200, 2400, 4800, 9600, 19200
                  also many non standard rates up to 100000.
                    Default Baud rate is 9600.
                    Transmission at higher rates than 19200 should
                  use a short cable.
Protocol        - Hardware handshake using CTS/RTS. Handshake need not
                  be used on rates below 50000 baud, in which case
                  RTS should be tied high.
```

S700 is configured as DCE and should be connected to most computers
(eg NEC PC9801) with a non-switching cable with the following
pin connections:

```
pin#     S700                COMPUTER
  1       FG   ----------      FG        Frame ground.
  2       RXD  ----------      TXD       Data in to S700.
  3       TXD  ----------      RXD       Data out of S700.
  4       CTS  ----------      RTS       Clear to send.
  5       RTS  ----------      CTS       Request to send.
  7       GND  ----------      GND       Signal ground.
```